STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Rhode Island Atomic Energy Commission
16 Reactor Road
Narragansett, RI 02882-1165
Telephone # 401-874-2600

August 7, 2018

Docket No. 50-193
Document Control Desk
U.S. Nuclear Regulatory Commission (NRC)
11555 Rockville Pike
Rockville, Maryland 20852

Attn: Mr. Patrick Boyle, Project Manager

Dear Mr. Boyle:

This letter and the enclosures constitute the annual report required by the RINSC Technical Specifications (Section 6.7.1). Enclosure 1 provides reactor operating statistics. Enclosure 2 provides information pertaining to unscheduled reactor shutdowns or scrams. Enclosure 3 discusses maintenance operations performed during the reporting period. Enclosure 4 describes changes to the facility carried out under the conditions of Section 50.59 of Chapter 10 of the Code of Federal Regulations. Lastly, Enclosure 5 summarizes the radiological controls information. If there are any questions regarding this information, please call me at 401-874-9442.

Sincerely,

Paul W Martin Jr
Reactor Supervisor

Enclosures (5)
Copy to:
Mr. Craig Bassett, USNRC
Dr. John J. Breen, Chairman, NRSC
Dr. Clinton Chichester, Chairman, RIAEC
Dr. Nancy Breen, RIAEC
Mr. Howard Chun, RIAEC
Dr. Yana K. Reshetnyak, RIAEC
Dr. Nitin Padture, RIAEC

Enclosure 1

Reactor Operating Statistics

Technical Specification Section 6.7.1.1

Month	Year	Operating Hours	MWH of Operation
July	2017	11.90	14.31
August	2017	141.53	229.46
September	2017	40.57	52.98
October	2017	29.23	30.93
November	2017	25.42	28.05
December	2017	18.92	16.44
January	2018	39.20	35.33
February	2018	54.43	44.04
March	2018	47.05	42.03
April	2018	52.78	44.93
May	2018	19.12	19.06
June	2018	20.25	20.93
Total	**FY2018**	500.40	578.48 MWH or 24.1 MWD

Total Energy Output Since Initial Criticality
67,364.31 MWH or 2806.85 MWD

ENCLOSURE 2

UNSCHEDULED SHUTDOWNS OR SCRAMS

Technical Specification Section 6.7.1.2

The following is a list of the unscheduled shutdowns or scrams that occurred during the 2017-2018 reporting period:

Date	Run No.	Logbook	Page	Cause	Description
07/17/17	9315	63	79	All shim safety blades dropped	All shim safety blades dropped while raising power from initial criticality. No indication of scram signal, magnet power still energized. No obvious indication as to cause.
09/06/17	9334	63	103	Power outage to facility	Facility loss of AC due to local storm
09/20/17	9338	63	109	Power outage to facility	Momentary loss of AC to facility
09/21/17	9339	63	110	Technician error	Rx scram due to spurious signal caused by inadvertently disturbing instrument rack power indication cabling while in the back of the instrument racks
11/14/17	9349	63	126	Instrument noise	Spurious scram due to instrument “noise”
12/28/17	9360	63	138	Instrument noise	Spurious scram due to instrument “noise”
02/08/18	9380	64	02	Instrumentation	WR 1 spiked while on the 200 kW scale which initiated scram
05/02/18	9437	64	60	All shim safety blades dropped	All shim safety blades dropped while raising power from initial criticality. No indication of scram signal, magnet power still energized. No obvious indication as to cause.
06/13/18	9444	64	68	Instrumentation	Attempted to fix loose connection on WR 1 after maintenance on the bridge, caused spike on WR1 which initiated scram

ENCLOSURE 3

MAINTENANCE OPERATIONS

Technical Specification 6.7.1.3 requires a listing of the major maintenance operations performed in the 2017-2018 reporting period including their impact upon the safe operation of the reactor and the reasons for the corrective maintenance.

No major maintenance has been performed in this reporting period.

ENCLOSURE 4
FACILITY CHANGES – 10CFR50.59 REVIEW

Technical Specification 6.7.1.4 requires that we provide a listing and description of any 10 CFR 50.59 evaluations conducted during the 2017-2018 reporting period.

No 10 CFR 50.59 evaluations were performed in this reporting period.

ENCLOSURE 5
RADIOLOGICAL CONTROLS

1. Environmental Surveys outside the Facility – Technical Specification 6.7.1.6

   Quarterly TLD[1] badges are deployed outside the reactor building in three separate locations. The quarterly doses in units of mrem are shown in the table below.

LOCATION	3rd QTR 2017	4th QTR 2017	1st QTR 2018	2nd QTR 2018
Northeast Wall	9	17	48	10
Demineralizer Door	122	36	97	35
Heat Exchanger Door	47	20	10	69

   The general public does not frequent these locations and therefore occupancy factors may be used to approximate annual dose. The allowable annual external dose for whole body must be below 100 mrem per year. Assuming that the maximum time that a member of the general public would be present in one of these locations is 10 minutes per day, an occupancy factor of 0.025 can be used to obtain the annual dose that would be received by a member of the general public, in any of these areas.

   The annual dose at the Northeast Wall, Demineralizer and Heat Exchanger Doors is dependent on the operations schedule of the reactor. Ignoring the fact that the dose rate is not present 24 hours per day, and applying the occupancy factor of 0.025[2], the annual dose that would be receive by an individual in the demineralizer room would be 7.25 mrem. The dose received at the Heat Exchanger Door would be 3.65 mrem. The annual dose received at the Northeast wall would be 2.1 mrem. The variations from quarter to quarter and from previous reports are also due in part to movements of items within the reactor building during the fiscal year and varying use of the different irradiation facilities.

2. Annual Exposures Exceeding 500 mrem for facility members, 100 mrem for non-staff members or 10 mrem for members of the general public – Technical Specification 6.7.1.7

   There were no personnel exposures greater than Technical Specification 6.7.1.7. requirements.

[1]Thermoluminescent Dosimeter; Mirion Technology reads the dosimeters at minimum of 1 mrem.

[2] Occupancy factor was changed from 0.01 to 0.025. 0.01 was derived using occupancy factor and use factor (it was assumed that the reactor is not running 8 hours every day). We will use 0.025, from NCRP 147 for Outdoors, unattended parking lots, attics, stairways, unattended elevators, janitor's closets. 0.025 is more conservative number than 0.01.

3. Radioactive Effluents – Technical Specification 6.7.1.5

A. Individual gaseous effluent concentrations for each reactor operation are recorded on the Monthly Information Sheets (Form NSC-78). The concentration of radioactive materials in the effluent released from the facility exhaust stacks shall not exceed 1E+05 times concentrations specified in 10CFR20, Appendix B, Table II, when averaged over time periods permitted by 10CFR20.[3]
Gamma spectroscopy of stack gas samples has shown that the principal gaseous effluent is Argon-41. The maximum concentration for this principle contaminant permitted under Technical Specifications is 1E-8 µCi/cc x1E+5 = 1E-3 µCi/cc. Average concentrations released during the year were 4.40E-5 µCi/cc and less than 0.044 of the limit.
The total Argon-41 release during the reporting period was 100.23 curies. The calculated effective dose equivalent for this release is 2 mrem/year (COMPLY Code). The Comply Code report is attached.

B. Liquid effluent concentrations released to the environment are documented on the Sewer Discharge Report (NSC-09). Each release was approved prior to discharge with its pH being within the acceptable range and with the sum of the fractions of the respective radioisotopes per month being below the discharge limit of 1. For the reporting period, the total volume of discharge was 1.84E7 ml. The isotopes and their relative activities discharged are given below.

Radioisotope	**Total Activity Discharged (microcuries)**
H-3	641.63
C-14	368.02
Pb-214	3.59
Bi-214	5.23
K-40	1.13

[3] Technical Specifications, Section 3.7.2.1

COMPLY: V1.7. 7/23/2018 10:44

40 CFR Part 61
National Emission Standards
for Hazardous Air Pollutants

REPORT ON COMPLIANCE WITH

THE CLEAN AIR ACT LIMITS FOR RADIONUCLIDE EMISSIONS

FROM THE COMPLY CODE - V1.7.

Prepared by:

RI Atomic Energy Commission
RI Nuclear Science Center
16 Reactor Road, Narragansett, RI 02882

Sangho Nam
401-874-2600

Prepared for:

U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Washington, DC 20460

COMPLY: V1.7. 7/23/2018 10:44

2018 Ar-41 release

SCREENING LEVEL 4

DATA ENTERED:

Nuclide	Release Rate (curies/YEAR)
AR-41	1.002E+02

Release height 35 meters.

Building height 18 meters.

The source and receptor are not on the same building.

Building width 18 meters.

Building length 20 meters.

STACK DISTANCES, FILE: Stack data 100.dat

DIR	Distance (meters)
N	100.0
NNE	100.0
NE	100.0
ENE	100.0
E	100.0
ESE	100.0
SE	100.0

SSE	100.0
S	100.0
SSW	100.0
SW	100.0
WSW	100.0
W	100.0
WNW	100.0
NW	100.0
NNW	100.0

COMPLY: V1.7. 7/23/2018 10:44

WINDROSE DATA, FILE: 2016 Windrose data 2m.dat

Source of wind rose data: 2016 Windrose data
Dates of coverage: 1954-1994
Wind rose location: Narragansett, RI
Distance to facility: 155 m

Percent calm: 0.05

Wind FROM	Frequency	Speed (meters/s)
N	0.062	2.00
NNE	0.058	2.00
NE	0.044	2.00
ENE	0.013	2.00
E	0.012	2.00
ESE	0.013	2.00
SE	0.058	2.00
SSE	0.049	2.00
S	0.058	2.00
SSW	0.084	2.00
SW	0.105	2.00
WSW	0.064	2.00
W	0.068	2.00
WNW	0.095	2.00
NW	0.104	2.00
NNW	0.068	2.00

Distance from the SOURCE to the FARM producing
VEGETABLES is 100 meters.

Distance from the SOURCE to the FARM producing

MILK is 100 meters.

Distance from the SOURCE to the FARM producing
MEAT is 100 meters.

NOTES:

The receptor exposed to the highest concentration is located
100. meters from the source in the NE sector.

He gets his VEGETABLES from a farm located
100. meters from the source in the NE sector.

He gets his MEAT from a farm located
100. meters from the source in the NE sector.

He gets his MILK from a farm located
100. meters from the source in the NE sector.

Input parameters outside the "normal" range:

COMPLY: V1.7. 7/23/2018 10:44

Windrose wind frequency is unusually LOW.

RESULTS:

Effective dose equivalent: 2.0 mrem/yr.

*** Comply at level 4.

This facility is in COMPLIANCE.

It may or may not be EXEMPT from reporting to the EPA.

You may contact your regional EPA office for more information.

********** END OF COMPLIANCE REPORT **********